N. A. C. A. BULLETIN

Vol. XXIII, No. 10 January 15, 1942

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This Bulletin is published semi-monthly by the National Association of Cost Accountants, 385 Madison Avenue, New York. Subscription price, $10.00 per year. Entered at the Post Office, New York, N. Y., as second-class matter August 28, 1925, under the Act of March 3, 1879.

EDITORIAL DEPARTMENT NOTE

As a result of a growing shortage in accounting and clerical personnel and the possibility of future difficulty in securing office machines and equipment, many companies may soon be faced with the necessity of simplifying and "streamlining" their accounting routines. In recognition of this situation, increased emphasis on labor-saving and simplified procedures will be provided in the articles published in the *Bulletin*. In this as in the January 1 issue, attention is directed toward ways and means of improving and simplifying the procedure involved in verifying, accounting for and paying creditor's invoices. Undoubtedly much can be done in improving methods and eliminating duplications in this area.

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Articles published in the *Bulletin* present many different viewpoints. In publishing them the Association is not sponsoring the views expressed, but is endeavoring to provide for its members material which will be helpful and stimulating. Constructive comments are welcomed and will be published in the Forum Section of the *Bulletin*.

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JANUARY 15, 1942

METHODS STUDY APPLIED TO AN ACCOUNTS PAYABLE SYSTEM

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Accounting Theory vs Application of Theory

THIS paper has been written to outline an improved accounts payable system. However, it is far more important that the reader grasp the basic premise of the approach to the problem, i.e., that the application of an accounting theory to accounting work must be conditioned by the economics and practicality of applying such theory to the case involved.

It is extremely unfortunate that for years the theoretical science of accounting has steadily advanced without a corresponding advance in the application of the practical science of accounting. As a result, the modern accountant is well versed in the complexities of present-day industrial accounting, taxation and costing but woefully inept in the ability to organize a clerical procedure to efficiently produce the complicated overlapping requirements of the accounting system.

Our present World War II is already developing in the war industries an amazing number of technological advances in factory production. Accounting organizations in these companies are, of necessity, being forced to maintain the same rapid pace. As a result, the technique of the application of accounting theory to clerical work is receiving a considerable impetus so that the end of this war should find in the accounting field a new type of super-accountant—one who can lay out the complete accounting structure and in addition design a mechanism of personnel, forms, routines and machines for efficiently operating the accounting structure.

Surely no thoughtful accountant can any longer delay recognizing this obvious fact—the necessity of eliminating duplication in clerical routines in the accounting system. By doing this he will accomplish many important objectives, as follows:

1. Clerical costs will be considerably reduced.
2. More employees will be available for the production of war materials and afterwards for the production of consumer goods and world rehabilitation requirements.

3. The accountant will have improved his personal technical ability and therefore be in a much better position to meet post-war competition.

Theory of Accounts Payable

The theory behind the recording of accounts payable is clear to even the student of elementary accounting. But unfortunately the theoretical accounting concept of recording liabilities immediately and paying for them later has resulted frequently in clerical monstrosities called "Accounts Payable Systems." These ill-conceived creatures are the elaborate routines, organizations and equipment required today to record and pay an invoice. The significance of this is that an accounting theory has given rise to a huge cumbersome vehicle for putting that theory into effect. This vehicle is today costing American industry hundreds of thousands of dollars in the form of unnecessarily elaborate accounts payable systems. These systems, when analyzed methodically, reveal an unbelievable number of duplications in clerical effort in such operations as recording the liability for the invoice, preparing the accounts-payable voucher, writing the check, and indexing the suppliers. This type of inefficiency has no rightful place in modern industry and least of all in a war-time economy.

An Actual Case Study

Several years ago it was recognized that certain economies would result in the accounting system through the application of properly organized clerical surveys. The first case selected for methods study was the accounts payable system. The survey was made in an organization, which, although not large, was sufficiently complete to provide a good field for investigation.

As a result of this study a new procedure for the accounts payable system was installed effective January 1, 1940. This has operated satisfactorily for two years at an annual saving of $2,000 on a volume of 25,000 invoices, or an average saving of eight cents per invoice. The basic savings of the new plan resulted from the following specific system improvements:

1. Reducing by approximately 50 per cent the number of employees involved in the routine.

2. Complete elimination of errors between two or more records prepared independently.
3. Elimination of duplications of similar information by combining many operations in one co-ordinated operation.
4. Use of a machine to get automatic totals.
5. Elimination of excessive flow of papers between different floors of the building.
6. Elimination of peak period work in all departments.

Under the old procedure invoices were recorded manually in an accounts payable register; posted to the subsidiary distribution accounts; filed for payment date; typed on a remittance advice and finally paid by a check-writing bookkeeping machine.

Under the new procedure invoices are paid when received, and the following six required records are made in one co-ordinated bookkeeping machine operation:

1. Account Distribution Ticket (One ticket is prepared for each account in order to secure monthly general-ledger control account totals).
2. Accounts Payable Register.
3. Accounts Payable Voucher.
4. Remittance Advice to Supplier.
5. Check to Supplier.
6. Cash Payments Book.

The reader at this point may be thoroughly disillusioned after learning that the "new system" pays invoices upon receipt and is therefore fundamentally a return to the age-old maxim "Pay your bills promptly." This apparently eliminates the highly advanced concept of accounts payable so expertly developed by the "accounting theoriticians" (but without regard to subsequent cost).

As a matter of fact, the methods study revealed that the policy was to pay promptly and thus take advantage of the normal cash discounts. Consequently, the new accounts payable system was merely a recognition of, and adaptation to, actual operation conditions. The interest lost under the new system by paying invoices ahead of due date amounted to about $30 per year but the saving in clerical effort was about $2,000 per year.

The Old Accounts Payable System

Ordinarily, before installing a new system, the old system must be studied by assembling and analyzing the facts. In this case study, a detailed analysis of facts is presented to enable the reader to compare his system, step by step, with the old system. Incidentally, the basic theory of the old system is the orthodox or conventional one taught in many schools and explained in great detail in numerous modern accounting texts and reference books. The old system was in effect for five years from 1935 to 1939 inclusive. Prior to 1935 an old-fashioned, completely manual system was in use for a number of years, which system required posting to an index of creditors for reference purposes. The duplications in this early system prior to 1935 far exceeded the duplications in the old system (1935-1939).

How the Old Accounts Payable System Operated

It is very important in this paper to consider the details of the old system as fully as the new one in order to understand the significance of the changes and the nature of the methods studies which effected these improvements. But before reviewing the detailed job analyses of the old system it will be very helpful to study the following tables in order to get a birds-eye view of that system.

TABLE NUMBER

1. Basic forms used in the old accounts payable system (This consists of the accounts payable register, accounts payable voucher and cash payments book, all of which were prepared independently of one another. Note the duplication existing in all of the forms.)
2. Table showing flow of suppliers invoices from location to location under old accounts payable system.
3. Table of volumes under old accounts payable system.

Job Analyses of the Old Accounts Payable System

A job analysis is a description of work performed by an employee. Job analyses are of greatest value in eliminating duplication of effort when they are prepared in considerable detail, listing every operation performed by the employee.

TABLE 1

BASIC FORMS USED IN THE OLD ACCOUNTS PAYABLE SYSTEM (FIVE FORMS)

TABLE 1

BASIC FORMS USED IN THE OLD ACCOUNTS PAYABLE SYSTEM (FIVE FORMS)

ACCOUNTS PAYABLE REGISTER (Prepared Manually)

Date	*Accounts Payable Ref. #*	*Supplier*	*Debit Distribution Account—Amount*		*Credit Accounts Payable Control*
1/1/38	1-1274	Atlantic Chemical Co.	25-600	$9.90	$9.90

ACCOUNTS PAYABLE VOUCHER AND DUPLICATE REMITTANCE ADVICE (Typed)

Date	*Check #*	*Cash Voucher #*	*Supplier Invoice #*	*Supplier*	*Discount*	*Net Amount*
1/31/38	19444	A-166	174 X	Atlantic Chemical Co.	$.10	$9.90

CASH PAYMENTS BOOK AND CHECK (Bookkeeping Machine)

Date	*Check #*	*Cash Voucher #*	*Supplier*	*Debit Accounts Payable Control*	*Credit Cash*
1/31/38	19444	A-166	Atlantic Chemical Co. 100 South Street New York City	$9.90	$9.90

SUMMARY OF DUPLICATIONS IN ABOVE FORMS (Indicates Number of Duplicate Entries)

Date of Entry	*Three Different Internal Reference Numbers*	*Supplier's Nume*	*Amount of Invoice*
3 times	5 times	3 times	5 times

Note:—Sixteen entries were required under the old system as compared with four entries under the new accounts payable system.

TABLE 2

TABLE SHOWING FLOW OF SUPPLIERS INVOICES FROM LOCATION TO LOCATION UNDER OLD ACCOUNTS PAYABLE SYSTEM

Operation	*Description*	*Building Location #*		
		3	*5*	*7*
1	Mail room receives incoming suppliers invoices		1	
2	Calculating machine operator checks computations	2		
3	Purchasing Unit checks invoices with tally	2		
4	Accounts Payable Unit enters invoices in register			3
5	Subsidiary Ledger Unit posts charges in ledgers			3
6	Cashier files invoices by payment date			3
7	Typist prepares accounts payable voucher	4		
8	Calculating machine operator adds voucher	4		
9	Bookkeeping machine operator prepares cash payment book and check	4		
10	Cashier checks completed accounts payable voucher			5
11	Auditor checks voucher and invoices	6		
12	Assistant Manager signs checks			7
13	Auditor mails checks	8		
14	Accounts Payable Unit files paid vouchers			9

Figures in above columns indicate change of location.

Note:—The above table indicates that each supplier's invoice was handled a minimum of fourteen different times by ten different employees. This involved a change of location nine times all in one building in which only three locations were used. The messenger boys called this "The Vicious Cycle." It was.

TABLE 3

TABLE OF VOLUMES UNDER THE OLD ACCOUNTS PAYABLE SYSTEM

Description of Items	*Volume Per Month*
Number of suppliers invoices received	2000
Number of different subsidiary accounts	2300
Ratio of different accounts to invoices	1¼ : 1
Accounts payable vouchers prepared	1200
Checks prepared	1200
Ratio of suppliers invoices to checks written	1⅔ : 1
Maximum number of invoices paid on one check	50
Maximum number of different accounts on one invoice	21
Approximate number of invoices unpaid at one time	250

There is one important point that the writer wishes to make in this connection: There is no easy road to large savings in clerical expense; it is a long difficult journey involving much hard work and study on the part of the executive, his accountants and his employees.

By far the most important part of the methods study of the accounts payable system was the job analysis of each employee involved in the routine. Without this factual basis, it is difficult to make important improvements in large organizations, as the routines are far too involved for any one person to know from experience. It is not at all unusual for the job analysis to reveal that two employees have been duplicating each other's work for years. This most frequently happens when the employees are in different departments and the work is started in the second department because it is not known that it is available in the first.

The job analyses appearing below covering the old accounts payable system were prepared by personally interviewing each employee. Ordinarily detail such as this is boring to the executive, and the writer has hesitated in inserting it for this reason. However it must be included for a very important reason—the write-up of the old system is a fairly standard one, yet a considerable number of its operations have been eliminated under the new system. It is suggested that the executive pass the job descriptions given below along to his chief accountant and ask him to check off those operations which are being performed under his system. If these job analyses are used as check lists by the reader's accountants they will undoubtedly result in uncovering unnecessary duplication of effort. Note that in the following job analyses the word *"eliminated"* indicates that the operation was discontinued under the new system.

Old Accounts Payable System

1. Supplier issues invoice.
2. Central purchasing department checks invoice for prices and terms and indicates the due date.
3. Calculating machine operator checks invoice extensions, totals, and computes and deducts discounts. (Invoices are entered in the accounts net and there is no accounting for the discounts in the ledger accounts. There is no objection to

accounting for discounts if management requires it.)

4. Local purchasing unit checks invoice with receiving tally, inserts charge account and approves for payment.
5. Accounts payable unit sets up the liability:
   (a) Sorts invoices by accounting month and suppliers.
   (b) *Eliminated*—Assigns accounts payable reference number to each invoice by means of a numbering machine.
   (c) *Eliminated*—Enters in an accounts payable register (manually) the following data for each invoice:
      1. Accounts payable reference number.
      2. Vendor's name.
      3. Debit amounts to various control accounts.
      4. Credit amount to accounts payable control.
6. Subsidiary ledger unit manually posts detail charges to the subsidiary ledgers.
7. Cashier prepares the invoices for payment.
   (a) *Eliminated*—Files invoices by due date and customer.
   (b) *Eliminated*—Each day withdraws from the file the invoices due that day; attaches an accounts payable voucher, remittance advice and check to the invoices for each supplier. Also stamps a cash voucher number on each voucher and in a voucher book and stamps a date on the voucher.
8. *Eliminated*—Typist types the following information on the voucher and duplicate remittance advice:
   (a) Vendor's name.
   (b) Check number.
   (c) Vendor's invoice reference number.
   (d) Discount amount
   (e) Net amount
   (f) The total of all invoices on the voucher is obtained manually by the typist or by a calculating machine operator if there were a large number of items to add.
9. *Eliminated*—Calculating machine operator adds the invoices for each supplier to insure that total checks with amount shown on the voucher.

10. Bookkeeping machine operator types the following data (Machine used is a six register machine with cross-footer and typewriter keyboard costing about $1,400 and check and cash payments book are prepared simultaneously.):
    (a) *Eliminated*—Accounts payable voucher number.
    (b) Vendor's name and address.
    (c) Total amount of credit to cash.
    (d) Total amount of debit to accounts payable control.
11. Cashier:
    (a) *Eliminated*—Checks amount of each invoice with amount typed on the cash voucher.
    (b) *Eliminated*—Checks name of vendor on voucher.
    (c) *Eliminated*—Proofreads all typing on check which includes the voucher number, vendor's name and address.
    (d) Stamps date on the check.
    (e) *Eliminated*—Signs name on voucher indicating preparation of the voucher.
12. Auditor:
    (a) Examines invoices for purchasing department approval.
    (b) Examines invoices to insure that they are all from the same supplier and that name of supplier corresponds with name on voucher.
    (c) *Eliminated*—Examines voucher for comptometer stamp.
    (d) Examines invoices and voucher to insure that they are both for the same accounting month.
    (e) Examines check to insure that supplier's name and amount of check agree with those on the voucher.
    (f) Signs name to voucher as being audited.
13. Assistant Manager signs check noting name of supplier and also any unusual item.
14. *Eliminated*—Auditor inserts check and remittance advice in envelope and mails. (This function was transferred to the mail room under the new procedure.)

15. Accounts payable unit.
    (a) Perforates accounts payable vouchers and invoices with date paid and files them alphabetically in a file for each supplier.
    (b) *Eliminated*—At end of accounting month totals outstanding invoices and balances with general ledger accounts payable control. If there is a difference, a team of three persons checks the accounts payable register, the accounts payable voucher and the cash payments book in order to locate the difference. (This required about 40 man-hours monthly.)

Summary of Old Accounts Payable System

The foregoing outline of the old system was obtained by a detailed methods study covering every phase of the work, i.e., the clerical system, the personnel, the floor layout, the forms and the accounts. All this confirmed in an exact and quantitative manner the management's observation that the accounts payable system was unnecessarily complicated. The following specific errors in system were found:

1. Too many different people were involved in the procedure.
2. The same persons handled the invoices many times.
3. The same data was recorded many times in different records.
4. The invoices changed locations too many times.
5. Payment of invoices on due dates created peak periods on the 10th, 25th and last day of the month in three different departments and disrupted normal operation on other work.
6. Difficulty in balancing accounts existed because the records were prepared independently of one another.

As a result of the above study, the management decided that the new system should be one which would produce *all required records in one machine operation.* By doing this, all of the above six fundamental errors so frequently found in systems study would automatically be eliminated. The only drawback to the proposed "one operation" system was that it required payment of invoices

upon receipt or the holding of invoices for later payment without the immediate recording of the liability.

In order to determine the effect of a change in policy from payment of invoices on the due date to immediate payment, a study was made of invoices held for payment on October 3, 1939. There was a total of 218 invoices amounting to $8,813.30, all falling due between October 4 and October 25. Calculations indicated that if these invoices were paid on October 3 instead of on the due dates, an interest loss of $2.29 per month would be incurred using a rate of 1 per cent per annum. That there were only 218 invoices unpaid out of 2,000 received monthly, and that an interest loss of only $2.29 would be incurred by immediate payment is explained by the following facts:

(a) The policy was to pay promptly to secure the usual cash discounts.
(b) To secure the cash discount required, in many cases, payment within ten days.
(c) The acounts payable routine was so elaborate that ten calendar days were required for the invoices to reach the check writing stage.

Consequently, in effect, 90 per cent of all invoices were being paid upon receipt under the old accounts payable system. It can easily be seen from these facts that the actual operating conditions did not warrant the dual work of first recording the liability and later paying for it. In fact the writer very seriously questions how any company can afford to maintain such a dual system once the true cost of it and the actual results obtained from it are known.

The New Accounts Payable System

The basic principles of the new accounts payable system outlined below can, with slight modifications, be used by almost any company regardless of whether the volume is 100 or 50,000 invoices per month.

As a result of the methods study, the following "one machine operation" accounts payable system was installed effective January 1, 1940 and has operated successfully for two years:

1. Supplier issues invoice.
2. Central purchasing department checks invoice for prices and terms and indicates the due date. (Due date is still indicated because some invoices are received too late for discount taking.)
3. Calculating machine operator checks invoice extensions, totals, and computes and deducts discounts.
4. Local purchasing unit checks invoice with receiving tally, inserts charge account and approves for payment. (Note that up to this point there is no change from old system.)

   (Note: The following steps are all confined to the same location in the building, thus eliminating the eight changes existing in the old system. In addition, 95 per cent of the movement of papers has been confined to three adjacent rooms in which are located respectively the three employees handling the bulk of the work, i.e., the bookkeeping machine operator, the cashier and the auditor.)

5. Accounts payable unit receives at 8:30 A. M. invoices approved for payment the previous day by the purchasing unit. Sorts invoices alphabetically by suppliers by current or previous month's expense. A 25-division horizontal sorting device is used. Lists amount of each invoice on an adding machine tape in duplicate in order to secure control total for the day's payment. The following three persons are advised of this control amount:
   (a) Bookkeeping machine operator in order that she may balance total of checks written for the day.
   (b) Auditor in order that he may audit checks prepared.
   (c) Cashier in order to meet the day's financial requirements.

The accounts payable unit then sends the invoices to the bookkeeping machine operator.

Let me say parenthetically that an expenditure of $50 converted the machine used under the old system for writing the check and cash payments book (two forms) to the new sys-

tem for writing all six required records. The discovery that a machine which had been in the office for five years could do a much bigger job was one of the most unusual developments of the methods study. Undoubtedly office equipment in use in American industry today is not more than 50 per cent effective because accountants are not familiar with its mechanical possibilities and machine salesmen are not acquainted with the ramifications of the customer's accounting system. It is opportune at this point to suggest to the reader that he have prepared lists of all of his accounting equipment and the functions in which it is used. He should then contact the salesman and the research department of the equipment manufacturer and request suggestions for using the equipment in other office functions or for combining office work.

6. The bookkeeping machine operator receives the invoices daily at 9:15 A. M. and in one co-ordinated machine operation prepares the following six required records (only four different forms):
   1. Accounts payable register.
   2. Account distribution ticket for general ledger control totals.
   3. Accounts payable voucher } One form (two
   4. Remittance advice for supplier } parts).
   5. Check to supplier.
   6. Cash payment book (on same form as accounts payable register).

The above six records are produced by one operator in one complete machine cycle at the rate of 20 checks per hour including all other forms. While this is apparently a very low production speed, it must be emphasized here that machine speeds are poor indicators of efficient systems if the attendant clerical work is not considered.

At this point it is advisable to study Table 4 showing the forms used under the new accounts payable system. The hypothetical case selected is one in which the payment involves a debit and a credit invoice. The debit invoice is charged to two different accounts and the credit invoice involves only one account.

TABLE 4

BASIC FORMS USED UNDER THE NEW ACCOUNTS PAYABLE SYSTEM (Six Records on Four Forms)

(All forms are produced in one co-ordinated bookkeeping machine operation)

		Column (a)	Column (b)	Column (c) Reg. No. 1	Column (d) Reg. No. 2	Column (e)	Column (f) Reg. No. 2	Column (g) Reg. No. 3	Column (h) Reg. No. 4
		ACCOUNTS PAYABLE REGISTER				CASH PAYMENTS BOOK			February 3, 1942.
Line No.	Operation	Reference Check No.	Account Supplier No.	Amount of each acct.	Total of Invoice	Supplier	Credit Cash	Debit Accounts Pay. February	Debit Accounts Pay. January
1	1st acct. dist. ticket	A19444	25–600	4.45					
2	2nd acct. dist. ticket	A19444	25–720	4.45					
3	Voucher (1st line)	A19444	174X		9.90				
4	3rd acct. dist. ticket	A19444	25–780	2.00cr.					
5	Voucher (2nd line)	A19444	174Y		2.00cr.				
6	Check				7.90	ATLANTIC CHEMICAL CO.			
7	Check					100 SOUTH STREET			
8	Check					NEW YORK CITY	7.90		7.90
	Sheet Totals			1,000.00			1,000.00	950.00	50.00

ACCOUNT DISTRIBUTION TICKETS

Account Distribution Tickets

		Reference	*Account*	*Amount*
1	1st acct. dist. ticket	A19444	25–600	4.45
2	2nd acct. dist. ticket	A19444	25–720	4.45
4	3rd acct. dist. ticket	A19444	25–780	2.00cr.

Accounts Payable Voucher and Remittance Advice
(Two Part Form)

		Check No.	*Supplier No.*	*Amount.*
3	Voucher (1st line)	A19444	174X	9.90
5	Voucher (2nd line)	A19444	174Y	2.00cr.
6	Check	Audited		7.90
7	Check			
8	Check			

CHECK

Check No. 19444 (Pre-printed)
Date—February 3, 1942 (Stamped)

Atlantic Chemical Co.
100 South Street
New York City 7.90

Signed .....

Columns a and b are typewriter keyboard operations. Column c is only one requiring key depressed amount. Column d is obtained from depressing balance key. Column e represents typewriter keyboard operations. Column f, g and h are all obtained semi-automatically like column d by depressing balance keys.

Now let us continue with a detailed study of the bookkeeping machine operation after having studied Table 4. The most important point to observe in connection with the machine operation is that the amount charged to an account need only be inserted in the machine once by key depression. After that, all other required amounts, such as the total amount of the invoice for the remittance advice, the total amount of the remittance advice, the amount of the check, the amount of the credit to the cash account and the amount of the debit to the accounts payable control are all obtained semi-automatically by depressing various balance keys. This means that if the original amount is correct, all five resulting amounts are also correct, and they are correct on all records and copies of records produced simultaneously. Thus by means of a mechanical device which produces all records in one operation and which contains an amount accumulating register, all of the difficulties of the old manual accounts payable system were eliminated.

The detailed machine operations are as follows:

1. The operator inserts in the machine a large sheet (covered by a carbon jacket) which is a combined accounts payable register-cash payments book form. This actually becomes a carbon copy proof sheet of all forms prepared on top of it. These forms are the account distribution tickets, the two-part accounts payable voucher-remittance advice form, and the check. The date is typed in the upper right hand corner of the sheet. The operator then selects from the batch of invoices to be paid, the two for the first supplier, i.e., the Atlantic Chemical Co. The first invoice happens to be charged to two different accounts. The second invoice, while affecting only one account, is a credit which is to be deducted from the first invoice.

2. Insert account distribution ticket at the left side of the machine over the carbon jacket and over the accounts payable register form and proceed as follows:

	Item	*Table 4*
(a) Type check number preceded by accounting month symbol. (A is for January, B is for February, etc.)	A19444	line 1, col. a
(b) Tabulate to account column and type account code.	25–600	line 1, col. b
(c) Tabulate to amount column, insert ac-		

	Item	*Table 4*
count amount on register adding keys and depress motor bar which adds figures into machine register No. 1.....	4.45	line 1, col. c
(d) Depress carriage return key which returns carriage to starting position, line 2.		
(e) Remove completed account distribution ticket.		

3. Insert second account distribution ticket and perform same machine operations as outlined above. ..... line 2

4. Insert accounts payable voucher at left side of the machine over the carbon jacket and the accounts payable register.

(a) Type check number preceded by accounting month symbol.....	A19444	line 3, col. a
(b) Tabulate to supplier reference number column and type supplier's invoice number.	174 X	line 3, col. b
(c) Tabulate to invoice total column (Machine Register No. 2) and depress balance key to print amount of invoice. This amount is automatically registered as the total of the two account distribution tickets which has previously been inserted.	9.90	line 3, col. d
(d) Depress carriage return key which returns the carriage to the starting position, line 4.		

5. Insert the third account distribution ticket for the second invoice and perform same machine operations as outlined above. ..... line 4

6. Re-insert accounts payable voucher and perform same machine operations for second invoice as outlined under item 4 above. Then, in order to obtain the total of the two invoices, perform the following operations: ..... line 5

(a) Depress space up motor bar.		
(b) Depress sub-total index key to print total on the voucher.....	7.90	line 6, col. d
(c) Remove completed voucher.		

7. Insert check in center of machine over carbon jacket and cash payments book:

(a) Tabulate to supplier's column.		
(b) Type supplier's name.....	Atlantic Chemical Co.	line 6, col. e
(c) Manually space up carriage.		
(d) Type supplier's street address.....	100 South St.	line 7, col. e

	Item	*Table 4*
(e) Manually space up carriage.		
(f) Type supplier's city address.....	N. Y. C.	line 8, col. e
(g) Tabulate to credit cash column (Machine Register No. 2)		
(h) Depress add crossfooter key and also register total key to print amount on check automatically.	7.90	line 8, col. f
(i) Remove check.		

8. In order to obtain distribution of expense between current and previous month, perform the following operations:

(a) Tabulate to the January column. (Machine Register No. 4).		
(b) Depress balance key to print automatically the same amount as appears on the check.	7.90	line 8, col. h

9. At the bottom of each sheet and also at the end of each day's work and the month's work throw machine totals for the following columns:

(a) Amount of each acct. (Reg. No. 1)....	$1,000.00	col. c
(b) Credit cash (Reg. No. 2)..... (This should equal the total invoices received and represents the total amount of checks written for the day.)	1,000.00	col. f
(c) Debit accounts payable (Feb.) (Reg. No. 3)	950.00	col. g
(d) Debit accounts payable (Jan.) (Reg. No. 4).....	50.00	col. h

At the end of the month, three general ledger journal entries are made by the accounts payable unit based on the above as follows:

1. Accounts Payable (January journal entry)		
Debit General Ledger Control Accounts (per detail account distribution tickets)	$50.00	
Credit Accounts Payable..... (This is general ledger accounts payable balance as of 1/31/42)		$50.00
2. Accounts Payable (February journal entry)		
Debit General Ledger Control Accounts	$950.00	
Credit Accounts Payable.....		$950.00
3. Cash Payments Book (February journal entry)		
Debit Accounts Payable	$1,000.00	
Credit Cash		$1,000.00

10. At the end of each day the account distribution tickets are sorted in a 50-division horizontal sorting device by general

ledger control account codes. Totals are obtained on adding machine tapes for each code for both the current month and the previous month. These totals are then posted on the bookkeeping machine to control account ledger cards. A machine proof sheet gives the total amount of daily postings which must check with the total amount of cash payments for the day. At the end of the month, these cards are used to prepare detail accounting distributions for journal entries 1 and 2 outlined above. As the accounts payable register journal entry is closed on the fifth working day following the end of the calendar month, all invoices received after that date are charged to the current month's expense in the accounts payable register.

The foregoing ends the description of the bookkeeping machine operator's work. The following continues with the description of other employees under the new accounts payable system.

7. Cashier receives from the bookkeeping operator the suppliers' invoices, accounts payable vouchers and checks, and performs the following operations:
   (a) Dates checks with rubber stamp.
   (b) Protectographs checks with machine.
   (c) Compares check with voucher and signs check manually.
   (d) Staples check to remittance advice (duplicate of accounts payable voucher).
   (e) Staples accounts payable voucher to suppliers' invoices.
   (f) Perforates accounts payable voucher and invoices with date of check by means of a perforating machine.

8. Auditor receives the following:
   (a) Accounts payable voucher stapled to the supplier's invoices; also the check stapled to the remittance advice.
   (b) Advice from accounts payable unit on total amount of invoices passed for the day.
   (c) Cash payment book sheet from the bookkeeping operator.

The auditor's duties consist of verifying the approvals on each invoice and comparing the supplier's name and address on the invoices with that on the check. Several other items are

checked. Most important of all, he ascertains that the amount of invoices as passed by the accounts payable unit per advice to him equals the amount of cash payments made for the day. An accounting is also made of the numbers of checks used. All accounts payable vouchers are signed by him as being audited and correct.

The completed checks and remittance advices are then sent to the mail room to be mailed in window envelopes.

The suppliers' invoices and attached accounts payable vouchers are then sent to the subsidiary ledger unit for manual posting in the detail expense and capital accounts.

9. The subsidiary ledger unit posts the detail account distributions to the various ledger accounts, using the check number for a posting reference.
10. Accounts payable unit then files the completed vouchers in folders alphabetically by suppliers. There is one folder for each supplier, and this file thus becomes a supplier index of paid invoices.

Savings in Time under New Accounts Payable System

As the above description completes the outline of the new system, it will be advantageous at this point to review a comparative table showing the savings in time by functions. This analysis is found in the following Table 5.

TABLE 5

TABLE OF SAVINGS BY FUNCTIONS EFFECTED BY NEW ACCOUNTS PAYABLE SYSTEM COMPARED TO THE OLD MANUAL METHOD

Function	*Hours Per Day*		
	Old System	*New System*	*Saving*
1. Accounts Payable Unit			
Entering invoices in acct. pay. register	3¼	..	4¾
Balancing accts. payable monthly	2	..	
Preparing invoices for payment	..	½	
2. Calculating operator			
Adding register and remittance advice	½	..	½
3. Cashier			
Filing invoices by payment date	3½	..	3
Dating and signing checks, etc.	¾	1¾	
4. Typist			
Typing remittance advice	1¾	..	1¾
5. Bookkeeping machine operator			
Preparing check and cash payment bk. (2 items)	3	..	–2
Preparing all six records	..	5	
6. Auditor			
Auditing vouchers and checks	1½	2	–½
7. Executive			
Signing checks (transferred to cashier)	½	..	½
8. Subsidiary ledger unit			
Posting to detail accounts	6	5¼	¾
9. Messengers			
Carry rush items	1	½	½
Total hours per day	23¾	14½	9¼

The above savings of over one employee were slightly offset by an additional stationery cost of about $10 per month and an interest loss of about $2.50 per month. If the time of the subsidiary ledger unit is eliminated from the above totals it will be seen that the new system reduced the time required by approximately 50 per cent.

Summary of Savings Under the New System

These savings resulted from many different changes. The accounts payable unit no longer had to prepare a manual accounts payable register, assign numbers to each invoice or spend 40 hours each month balancing the open invoices. The calculating machine operator work was eliminated as the bookkeeping machine automatically obtained voucher totals. The cashier no longer had to maintain a tickler due date file and assign accounts payable voucher numbers. In addition it was no longer necessary for him to check the accuracy of the monthly statements received from suppliers as few statements were received because the invoices were paid so promptly. The work of typing vouchers was eliminated entirely as this was done by the bookkeeping machine. Three sorting devices were purchased for the numerical sorting of account distribution tickets, the alphabetical sorting of supplier's invoices and paid vouchers, and for the numerical sorting of cancelled checks. The subsidiary ledger unit work decreased as invoices were posted once a day, thus eliminating the re-handling of ledger accounts several times in one day. The placing of all operations in one location eliminated the "vicious cycle" which formerly extended the work cycle and required messengers to carry records to many different locations.

Another saving resulted from the external auditing viewpoint. One phase of auditing the accounts payable under the old system was to trace accruals from the accounts payable register to the cash payments book by means of the paid supplier's invoice file. Under the new system the work is greatly simplified as the accounts payable register and the cash payments book are on one machine-produced form and there is only one reference number, the check number, rather than three under the old system.

Possible Variations of the System

Numerous improvements in the new system outlined above are possible under certain conditions. For instance, instead of preparing account distribution tickets, the subsidiary ledger card can be posted directly in the check writing operation. This was not done in the present system because it was felt that the complexities of the subsidiary ledger requirements would be too cumbersome. Also the ledgers were needed currently for the posting of other charges and the preparation of statements.

It is also possible to have one composite form for the account distribution ticket, the voucher-remittance advice, and the check. If one pack form were used instead of the three outlined in the new system, the time of inserting and removing forms would be considerably reduced. This was not believed to be practical because the number of account distributions on one invoice ranged from 1 to 20 and the number of invoices on one check ranged from 1 to 20.

This new accounts payable system can be used by any company either large or small. If the company cannot afford to spend $1,400 for a machine (the machine can also be used for payroll, accounts receivable, etc.) then it can purchase a form-writing machine (a typewriter especially built for holding many forms) for $300 which will accomplish the same purpose, preparing all records at once. But it will not have any adding registers to obtain daily totals or a crossfooter to automatically obtain invoice total and check total. If the company is unable to purchase any special machine, it can still operate the system on a typewriter by having a forms manufacturer prepare a set of forms along the lines enumerated above, using preferably a three-part form containing in the first part perforated sections for account distribution, in the second part the remittance advice, and the third part the check, a carbon copy of all of which could be the accounts payable voucher. If the company has no typewriter, the job can still be done manually by a form as explained above. Above all, the important point to remember is that it is possible to eliminate duplication of effort and unnecessary work regardless of the size of the company, the equipment or facilities available, or the accounting theory involved, providing, of course, that the management really endeavors to cut out red-tape clerical routines.

Conclusion

The writer has endeavored to present in this article a case study on the application of the scientific approach to the solution of an actual accounting problem. The results in this particular case were very satisfactory and the savings were substantial. However, this case is only one of many such similar outward manifestations of errors in application of fundamental accounting theory to practical system operation. This problem of designing efficient accounting systems is, without question, the most important one facing the

accounting field today, and with its solution will come large savings in clerical overhead expense.

The writer here suggests that a broad program is required to reeducate the accountants to an understanding of the two sides of accounting—accounting theory and application of theory. This reeducation is required in every different group within the accounting field. The educators in our schools should place as much emphasis on practical accounting system installations as on accounting theory. This can be accomplished by the use of "System" text books and by addresses to students by outside business speakers on actual company accounting installations. The accounting students should endeavor to learn as much as possible about practical accounting applications by attending meetings of accounting societies, business equipment shows and studying the literature of the equipment manufacturers.

The accounting clerks should analyze their jobs and suggest improvements for they are in a much better position than anyone else to do this. The accounting supervisors should periodically review their systems in an objective manner in an effort to eliminate duplications arising from misapplied accounting theory or other reasons. The accounting machine salesmen should increase their knowledge of basic accounting theory and of their customers' accounting systems in order to more fully utilize the remarkable mechanical developments of their companies' technical engineers. The auditing profession should make a greater effort to assist their clients with suggestions on improving the efficiency of the accounting system.

Methods accountants should keep informed on the latest developments in all types of office equipment applications in order to be in a position to make the correct application. The company's management should institute periodical surveys of clerical procedures to eliminate the inevitable inefficiency which constantly creeps in the systems. The larger companies should organize an accounting research staff department with the function of establishing the best methods for the entire company.

And finally, accounting writers, accounting research workers and accounting fundamentalists should recognize the problem of "Accounting Theory vs. Application of Theory" and assist in its solution through new creations in thought in the form of advanced concepts brought before the accounting field.

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